CLAIMS

1. A tensioning apparatus (200) comprising:

a shank member (236) comprising a length along a longitudinal axis and an outside surface parallel to the longitudinal axis along a mating portion (36);

an annular member (206) comprising an opening (18) defined by an inside surface (16) parallel to the longitudinal axis and sized to receive the shank member mating portion with an interference fit for resisting relative motion under the influence of a tensioning force being transferred there between; and

a fluid passageway (20) for selectively delivering a fluid pressure between the shank member outside surface and the annular member inside surface to generate a radial force with no axial force component to expand the opening for relaxing the interference fit for selectively allowing the relative motion between the annular member and the shank member along the mating portion.

2. The tensioning apparatus of claim 1, further comprising a tensioner (210) responsive to a fluid pressure for applying the tensioning force into the shank member by pulling on the shank member while pushing on the annular member.

3. The tensioning apparatus of claim 2, wherein the tensioner further comprises:

a piston (108) disposed within a cylinder (110) to define a pressure chamber (112);

a first of the piston and cylinder connected to the shank member for applying the tensioning force to tension the shank member and a second of the piston and cylinder connected to the annular member for applying a reaction force through the annular member.

4. The tensioning apparatus of claim 2, further comprising:

a single pressure source (214) providing the fluid pressure to the fluid passageway for relaxing the interference fit and to the tensioner for applying the tensioning force; and

the tensioner being selected to provide a desired tensioning force to the shank member at a fluid pressure value that is necessary to relax the interference fit when the shank member is carrying the desired tensioning force.

5. The tensioning apparatus of claim 2, further comprising:

a pressure source (214) in fluid communication with the tensioner for applying the tensioning force; and

the pressure source in fluid communication with the fluid passageway through a pressure converter (202) for relaxing the interference fit.

6. A tensioning apparatus claim 5, further comprising:

oil (208) used as a working fluid in the pressure source and being provided to the tensioner and to a first side of the pressure converter; and

water (204) used as a working fluid on a second side of the pressure converter and being provided to the fluid passageway.

7. The tensioning apparatus of claim 1, the fluid passageway further comprising:

a hole (24) formed from an outside surface of the annular member to the opening; and

a groove (26) formed along the inside surface of the annular member and intersecting the hole.

8. The tensioning apparatus of claim 1, wherein the tensioner further comprising:

an axial passageway (86) formed in the shank member; and

a circumferential groove (88) formed on the outside surface of the shank member in fluid communication with the axial passageway via a radial hole (87).

9. A tensioning apparatus of claim 1, the fluid passageway further comprising:

an axial passageway (268) formed in the shank member;

a circumferential groove (272) formed on the outside surface of the shank member in fluid communication with the axial passageway through a radial hole (270); and

a pair of spaced apart circumferential grooves (260) joined by a helical groove (262) formed on the inside surface (264) of the annular member (266).

10. The tensioning apparatus of claim 1, further comprising the annular member selected to have a coefficient of thermal expansion that is lower than a coefficient of thermal expansion of the shank member.